STATE OF THE STATE

Taking stock of a decade of climate progress in California agriculture

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A CLIMATE PLATFORM
FOR CALIFORNIA AGRICULTURE

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Taking stock of a decade of climate progress in California agriculture

SEPTEMBER 2023

A Climate Platform for California Agriculture is CalCAN's contribution to the rich and complex dialogue and strategy about how California agriculture can move boldly and quickly toward a carbon-neutral and climate-resilient future. It consists of two parts:

Part 1. State of the State: Taking stock of a decade of climate progress in California agriculture

Part 2. Tools for Transformation: Cultivating climate resilience in 2030 and beyond

The full report is available on the CalCAN website: calclimateag.org/ca-agriculture-climate-platform

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The California Climate and Agriculture Network (CalCAN) is a statewide coalition of sustainable farmers and ranchers and allied organizations, agricultural professionals, scientists, and advocates that advances state and federal policy to realize the powerful climate solutions offered by sustainable and organic agriculture.

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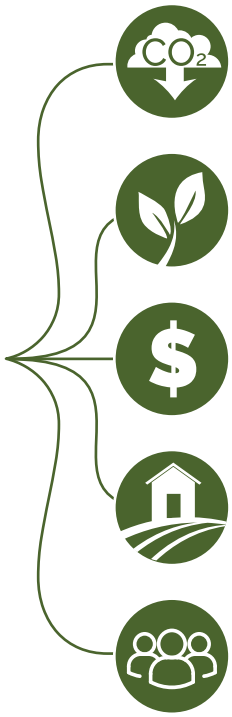
INTRODUCTION

The impacts of climate change on our food system are being felt by people across California. Farmers and ranchers struggle to meet the challenges of increasingly scarce water, extreme heat, flooding and wildfire events, and unpredictable weather and pest patterns. Even experienced farmers are struggling to stay in business, and new farmers face not only climate-related challenges but also a lack of access to affordable, secure land. Climate-related crop losses are on the rise, driving up food prices and increasing the number of people who are food insecure and hungry. Farmworkers are on the front lines, exposed to unhealthy air and facing the reality of working on more dangerously hot days. They and their families and communities are among the most economically vulnerable and often lack access to healthy food, safe drinking water, and air-conditioned, energy efficient, and affordable homes.

California is one of the most productive agricultural regions in the world and it is the largest food-producing state in the country. Planning for and managing the rapid transition to a net carbon neutral and climate-resilient agriculture system must be one of our highest and most urgent priorities.

What principles guide our vision of climate-resilient agriculture?



CLIMATE HEALTH	Farms and ranches adapt to and recover from climate shocks, and are net sinks for greenhouse gases rather than net sources
ECOLOGICAL HEALTH	Food is produced in balance with natural resources while maximizing biological diversity
ECONOMIC HEALTH	Farmers and ranchers are profitable and productive and the economies of rural communities are thriving
FARMLAND HEALTH	Productive agricultural land is permanently protected and there is abundant access to land for new farmers and racially diverse farmers
HUMAN HEALTH	The people who grow our food have safe working conditions, and communities have clean air and water and healthy food

This work has begun. The state of California has put in place a variety of government policies and financial incentives. Scientific research to identify the farming and ranching practices with the greatest climate benefits has accelerated. There is a growing workforce of technical assistance providers who can help translate the science into practice. Food businesses are responding to consumer concerns about the climate footprint of their products. Importantly, more and more farmers and ranchers are willing to try new approaches, recognizing that the survival of their businesses and the industry depends on innovating and adapting.

Since 2009, the California Climate and Agriculture Network (CalCAN) has been devoted to the work of advocating for state and federal policies that accelerate this necessary transition in agriculture. We are farmer-centered advocates for science-based, practical agricultural climate solutions. Our work is grounded in the belief that making this transition will ultimately lead to a healthier, more equitable, more humane, more generative, and more vibrant and biodiverse food and farming system and rural landscape.

A Climate Platform for California Agriculture is CalCAN's contribution to the rich and complex dialogue about how California agriculture can move boldly and quickly toward a carbon-neutral and climate-resilient future. We focus on the central role that the state and federal government can play in catalyzing change and acting in the public interest. For example, governments can use a combination of incentives and regulation to change the indicators that drive agricultural businesses, and they can impose mandates when needed. They can fund research, education and pilot projects, and can use their purchasing power to create new markets. They can convene the best and brightest innovators and leaders from diverse backgrounds with expertise to guide the way.

The Platform consists of two parts. What follows is *Part 1: State of the State*, a summary of the progress made by the state and federal government over the past decade to support California farmers and farmworkers in their efforts to reduce net greenhouse gas emissions and adapt to climate change. In *Part 2: Tools for Transformation*, 50 policy recommendations that contribute to reaching California's 2030 climate and biodiversity goals and moving toward climate resilience in agriculture.

A DECADE OF PROGRESS

In 2011, CalCAN released a report entitled *Ready … or Not? An Assessment of California Agriculture's Readiness for Climate Change*.[1] We identified the following serious deficits in the resources available to help farmers prepare for and mitigate climate change:

RESEARCH	Only 39 climate-related scientific studies focused on California agriculture practices were available.
TECHNICAL ASSISTANCE	There were only 200 Cooperative Extension farm advisors and 119 specialists, a 40 percent decrease since the early 1990s. Resource Conservation District (RCD) budgets and staff had been cut. Staffing at the Natural Resources Conservation Service (NRCS) had declined by seven percent since 2005, despite increased farmer demand for conservation funding.
INCENTIVES	California had no state-funded farmer incentive program for on-farm conservation, let alone any climate-focused agriculture grants. Seventy percent of farmers applying to the U.S. Department of Agriculture's (USDA) conservation cost-share programs were denied due to a lack of funding.

Over the past decade, much progress has been made. There is now a significant body of scientific research (too much to summarize in this report) that guides both policy and practice. It lends confidence to models used to evaluate the greenhouse gas (GHG) benefits of on-farm climate smart practices and equips technical assistance providers with the information they need to guide producers about best practices. Over time, the state has increased the attention paid to agriculture in its climate planning processes, and in recent years has set climate targets for agriculture.

The state has launched several "Climate Smart Agriculture" (CSA) programs designed to reduce on-farm GHG emissions and sequester carbon by making grants to farmers and ranchers to adopt management practices that improve soil health, conserve water and energy, or reduce methane emissions on livestock operations. There has also been some funding for demonstration projects to research and showcase practices and for technical assistance programs to assist with outreach, conservation planning, grant applications, contract compliance, and implementation. There is also a program that funds easements to permanently protect agricultural lands—and the carbon in their soils and woody vegetation—from urban development. Together, these programs have committed almost $450 million in grants to date.

To capture the scope of progress made since 2011, we compiled the timeline shown in Figure 1. It summarizes the evolution of the agriculture elements of California's plans, targets, and funding programs. It also includes several new agricultural conservation programs that also have climate co-benefits. In taking stock of this progress, there is much to celebrate.

1 CalCAN. 2011. Ready … Or Not? An Assessment of California Agriculture's Readiness for Climate Change

Figure 1:

CALIFORNIA CLIMATE AND AGRICULTURE POLICY MILESTONES

All data are current as of September 2023, as reported by the agencies administering the programs.

2006

Global Warming Solutions Act, AB 32 (Pavley and Nuñez)
Sets California's first GHG emissions reductions targets.

2014

Launch of the Sustainable Agricultural Lands Conservation (SALC) Program
Funds agricultural easements to permanently preserve farmland at risk of development.
DOC funding awarded: $373 million[a]

Launch of the State Water Efficiency & Enhancement Program (SWEEP)
Executive order launches SWEEP to fund on-farm water and energy use efficiency projects.
CDFA funding committed: $186 million[b]

SB 1383 (Lara)
Sets a goal of reducing methane emissions by 40% below 2013 levels by 2030 and sets local organic waste diversion procurement targets. Spurs state investment in dairy methane digesters and alternative manure management.

2016

Launch of the Healthy Soils Program (HSP)
Provides grants to farmers and ranchers to use practices that reduce GHGs and sequester carbon in soils and woody plants and partner with researchers for on-farm demonstrations and research.
CDFA funding committed: $173 million[c]

2017

Launch of the Alternative Manure Management Program (AMMP)
Funds dairies and livestock operations to reduce methane emissions by transitioning to dry manure management, solid separation, or increased pasture grazing.
CDFA funding committed: $106.6 million[d]

2018

AB 2377 (Irwin)
Creates a technical assistance program at CDFA to assist farmers applying to HSP, SWEEP, and AMMP.

2019

Launch of the Working Lands and Riparian Corridors Program
Funds the restoration or enhancement of working lands and riparian corridors through projects on agricultural lands.
DOC funding committed: $8.4 million

2020

30x30 Natural and Working Lands biodiversity goal
Executive order sets a goal of conserving at least 30% of California's land and coastal waters by 2030. Calls on CDFA to accelerate natural carbon removal and build climate resilience in agricultural soils. CNRA launches the Natural and Working Lands Climate Smart Strategy.

2021

Launch of the Conservation Agriculture and Planning Grant Program
Funds conservation planning projects.
CDFA funding awarded: $13.2 million

Launch of the Pollinator Habitat Program
Provides grants to support pollinator habitat and reduce GHG emissions on agricultural lands.
CDFA funding committed: $12.25 million

Launch of the Climate Smart Land Management Program
Provides grants for projects or to develop plans that increase climate action on natural and working lands in accordance with the state's NWL Climate Smart Strategy.
DOC funding committed: $10 million

Launch of the Water Efficiency Technical Assistance Program
Funds technical assistance grants to assist farmers with on-farm water and energy efficiency and pest management.
CDFA funding committed: $12.4 million

Launch of the Multibenefit Land Repurposing Program
Funds groundwater sustainability projects that reduce groundwater use, repurpose irrigated agricultural land, and provide wildlife habitat.
DOC funding committed: $82.6 million[e]

CARB 2022 Scoping Plan Update
First Scoping Plan to include targets for agriculture:

- Implement climate smart practices on 80,000 acres of cropland annually by 2045
- Implement land easements/conservation on 5,560 acres of annual cropland
- Increase organic agriculture to 20% of all cultivated acres by 2045 (about 65,000 acres transitioned annually)

2022

CNRA Pathways to 30x30
Identifies strategies to achieve the 30x30 goal, including conservation easements on rangeland.

CNRA Natural and Working Lands Climate Smart Strategy
Following the 30x30 executive order in 2020, this identifies a strategy to expand nature-based solutions to achieve the state's climate goals.

AB 1757 (C. Garcia, 2022)
Requires CNRA, in collaboration with other state agencies and an expert advisory committee, to set state targets for carbon sequestration and develop methods for tracking GHG emissions and carbon sequestration.

California Climate Crisis Act, AB 1279 (Muratsuchi, 2022)
Sets a target of net zero greenhouse gas emissions by no later than 2045 and 85% below 1990 levels by 2045.

Launch of the Organic Transition Program
Supports farmers and ranchers in transitioning land to organic certification.
CDFA funding committed to date: $9.5 million

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Figure 1 Footnotes:

[a] The SALC program will not announce program funding available for the next round until cap and trade proceeds have been determined in Nov. 2023.

[b] Includes $63M in funding that has been committed but not awarded in 2023 solicitations but not awarded: $40M for block grants and $23M for incentives.

[c] Includes $45M in funding that has been committed but not awarded in 2023 solicitations but not awarded: $29 for block grants, $32 for incentives, $4 for demonstration projects, as well as $10M that was awarded in the Budget Act of 2024 for FY 2023-24.

[d] Includes $20.9M in funding that has been committed but not awarded in a 2023 solicitation, including some funds for AMMP technical assistance.

[e] This includes $5.6 in funding that has been committed but not awarded to tribes.

CALIFORNIA'S CLIMATE AND AGRICULTURE TARGETS, GOALS, AND PLANS

California's first piece of legislation setting legally-binding targets for reducing greenhouse gases was passed in 2006 (AB 32, the Global Warming Solutions Act). Since then, the California Air Resources Board (CARB) has produced a total of four Scoping Plan Updates, reporting on the state's progress on meeting its climate goals and laying out the path forward.

The 2022 Update[2] includes an agriculture chapter that is considerably more robust and comprehensive compared to the first Scoping Plan in 2008. It calls for implementing climate smart practices on 80,000 new acres of cropland every year through 2045, implementing land easements/conservation on 5,500 acres of annual cropland, and increasing organic agriculture to 20 percent of all cultivated acres by 2045, translating to about 65,000 acres transitioned annually.[3] Table 1 summarizes progress made toward these goals as of August 2023.

Table 1. California's Agriculture-Related Climate Targets

Target	Target date	Current Progress (as of August 2023)
Reduce dairy and livestock methane emissions by 40% below 2013 levels = Reduction of 9 MMT CO_2e (SB 1383)	2030	**NOT ON TRACK.** Have achieved a reduction of 3.63 MMT CO_2e. At this rate, by 2030 we will only reach a reduction of 4.6 MMT CO_2e, about halfway.[4]
Climate smart practices used on 80,000 new acres annually (2022 Scoping Plan Update)	2045	**SOMEWHAT ON TRACK.** To date, the Healthy Soils Program has incentivized an average of 57,832 acres per year with wide variations by year depending on funding available.
Add 5,500 acres annually of cropland protected by agricultural conservation easements (2022 Scoping Plan Update)	2045	**ON TRACK.** Grants made by the Sustainable Agricultural Lands Conservation Program alone account for more than 5,500 acres of new easements annually.
20% of California's cultivated acreage (fruits, nuts, vegetables, and field crops) under organic cultivation, adding about 65,000 acres per year (2022 Scoping Plan Update)	2045	**ON TRACK/EXCEEDING GOAL.** Without any state organic transition incentives, organic cultivated acreage increased by 65,000 acres from 2019 to 2020 and another 137,000 acres in 2021.[5]

[2] California Air Resources Board 2022 Scoping Plan Update
[3] 2022 Scoping Plan Update, p. 82, p. 255
[4] Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target, pp. 10–12
[5] Calculated using CDFA's annual organics reports: CDFA Reports

The 2022 Scoping Plan marked some progress in terms of seeing agriculture as a sector capable of delivering powerful and unique climate strategies. However, CalCAN maintains that the Scoping Plan targets, which are non-binding administrative targets, fall far short of what is both possible and necessary for tackling the climate crisis and protecting our food supply.

In part due to the advocacy of CalCAN and our partners calling for greater ambition in the agriculture sector, in September 2022 AB 1757 (C. Garcia) was signed into law. The bill directs the California Natural Resources Agency (CNRA) to expand on the Scoping Plan and to identify "an ambitious range of targets for natural carbon sequestration, and for nature-based climate solutions … to be integrated into the Scoping Plan and other state policies" by January 1, 2024.[6] CNRA is leading this work in collaboration with the California Department of Food and Agriculture (CDFA) and an expert advisory committee. Both agencies are hiring staff to implement AB 1757.

Photo Credits: USDA-NRCS

CLIMATE SMART AGRICULTURE INCENTIVES PROGRAMS

In 2011, at the time of our first assessment of California agriculture's readiness for climate change, the state did not have any incentive programs to help farmers and ranchers transition to climate-resilient practices. Over the past decade, CDFA has launched the following four Climate Smart Agriculture programs explicitly aimed at reducing net greenhouse gas emissions:

- **State Water Efficiency and Enhancement Program (SWEEP)** to improve on-farm water use efficiency and save energy
- **Healthy Soils Program (HSP)** to improve soil health and carbon sequestration and reduce emissions; there is also a separate demonstration project component within HSP
- **Alternative Manure Management Program (AMMP)** to reduce methane emissions on dairies and other livestock operations
- **Dairy Digester Research and Development Program (DDRDP)** which funds anaerobic digesters on California's largest dairies but leaves out small and medium-sized and organic operations[7]

[6] https://resources.ca.gov/Initiatives/Expanding-Nature-Based-Solutions

[7] CalCAN focuses on programs that serve small and medium-sized and organic operations and underserved producers, so this report will not include an overview of the DDRDP program

Impact and Reach

The grants made through HSP, SWEEP, and AMMP help reduce the financial risk involved in learning about and implementing new agricultural practices and can cover some or all of the costs of capital expenditures in new equipment and materials. These three programs have distributed a total of $305 million across 55 counties and sequester an estimated 712, 614 MT CO_2e annually. SWEEP has conserved an estimated 4,800 acre-feet of water per year.[8] Collectively, the programs have funded about 3,000 on-farm projects,[9] reaching about four percent of the state's farms and ranches (see Table 2).

The financial barriers for adopting new practices are particularly challenging for small and medium-sized farms, farmers of color, and limited resource farmers. As shown in Table 2, the funding to date allocated to socially-disadvantaged farmers and ranchers (SDFRs), who comprise 19 percent of the farming population, is approximately proportional), while women, who comprise 37 percent of the farming population, are underrepresented in the programs.[10] The state has an important role in helping these farmers in particular with direct incentives to help them both adapt to and mitigate climate change. We believe that one of the roles of government and public resources is to address historical injustice. Therefore, public funding and technical assistance should be prioritized for small and medium-scale and systematically disenfranchised farmers and should go beyond parity to address structural inequity.

While the CSA programs alone are insufficient for the transformation needed in our agriculture system, they can serve as real-world models of farming and ranching practices that deliver climate and other environmental and health co-benefits, over time helping to shift business-as-usual practices toward greater climate resilience.

Table 2. Summary of Climate Smart Agriculture Programs (2014–2022)

Incentive Program	Total Funding Awarded ($ million)[11]	Number of Awards Made	Counties Reached	Acres Reached	% of Dollars Awarded to SDFRs[12]	% of Dollars Awarded to Women	Estimated Annual Emissions Reductions (MT CO_2e)	Estimated Cumulative Emissions Reductions (MT CO_2e)[13]
HSP[14]	$96.54	1,544	55	289,163	26%	18%	361,484[15]	1,084,452
SWEEP	$123	1,130	40	168,000	34%	18%	93,000[16]	930,000
AMMP	$85.68	147	13	N/A	8%	9%	258,130[17]	1,290,650
Total	**$305.2**	**2,821**	**55**	**457,163**	**24%**	**15%**	**712, 614**	**3,305,102**

[8] 2022 SWEEP Southern Desert Region Funding Selection

[9] Does not account for repeat grantees.

[10] 2017 Census of Agriculture. Note: The percentages cited reflect the demographics of all farm producers, which can include up to four producers per farm.

[11] These totals do not include funds committed but not yet awarded in 2023.

[12] Calculated for all years demographic program data were available for each program: HSP: 2017–2022; SWEEP: 2018–2022; AMMP: 2019–2022. Data from CDFA.

[13] Cumulative emissions reductions calculations are based on CDFA's expected project life for each program, based on projects funded 2017–2022.

[14] HSP totals only reflect the incentive portion of the program, including the 2023 Block Grant pilot, but do not include the Demonstration component.

[15] CDFA assumes that annual GHG emissions reductions from an HSP project persist for three years.

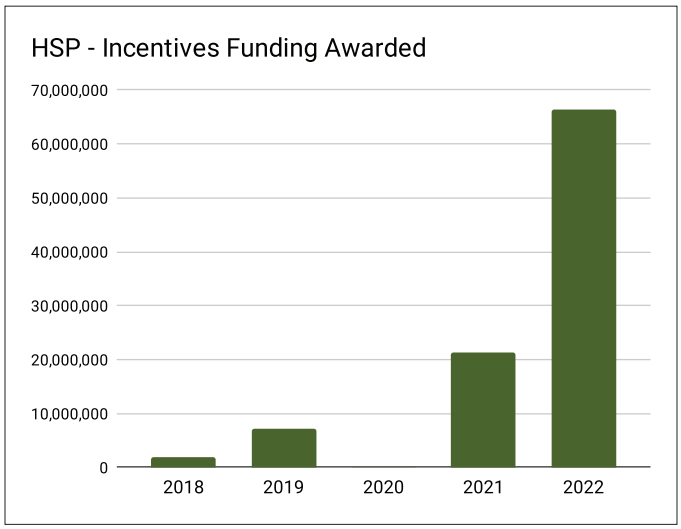
[16] CDFA assumes that annual GHG emissions reductions from a SWEEP project persist for 10 years.

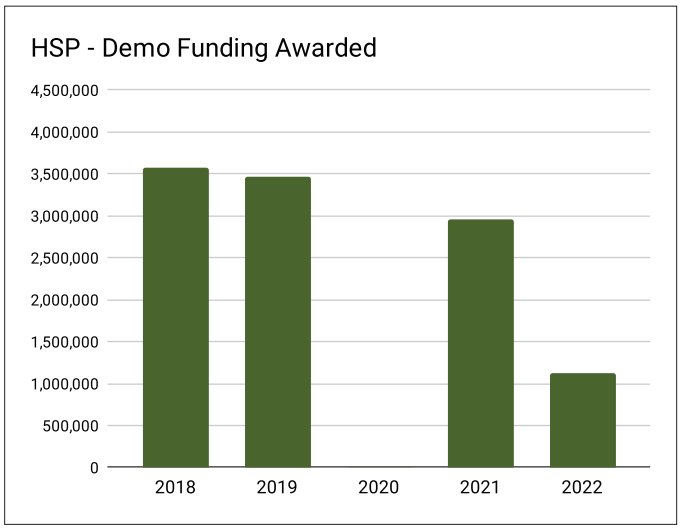
[17] CDFA assumes that annual GHG emissions reductions from an AMMP project persist for five years.

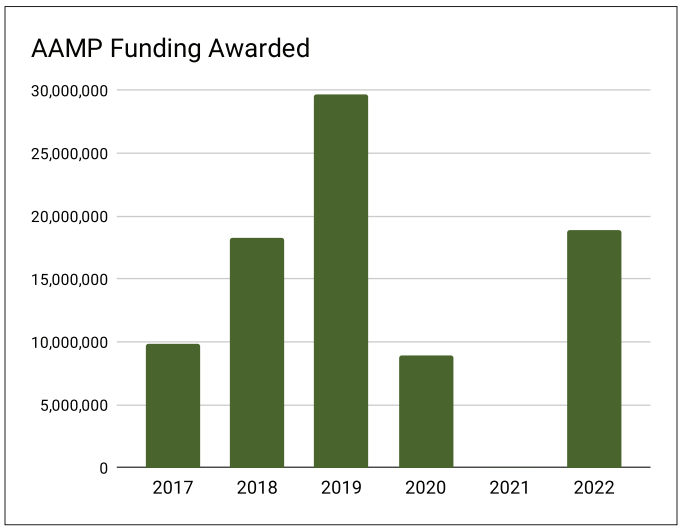
Inconsistent Funding

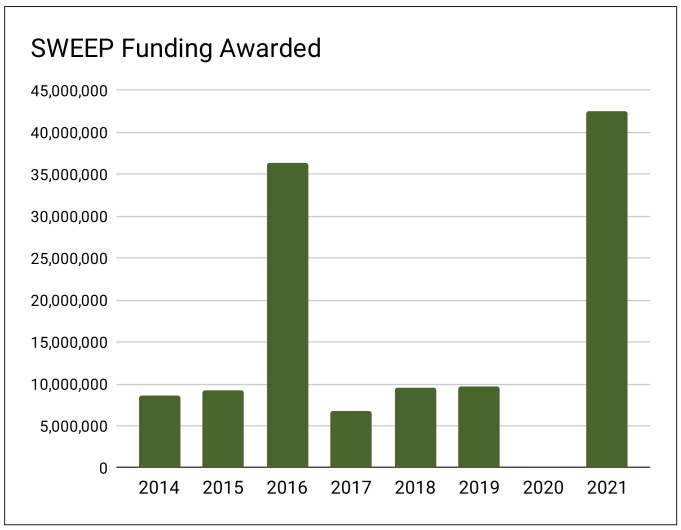
All three CSA programs have been hampered by the inconsistent and unreliable funding available, as shown in Figure 2. This makes it challenging for farmers to plan ahead and prepare their applications, and it has made the job of technical assistance providers more difficult since they have little notice about when funding periods may open and have to adjust staffing levels on short notice.

Figure 2. Variation in Funding Levels for Climate Smart Agriculture Programs[18]









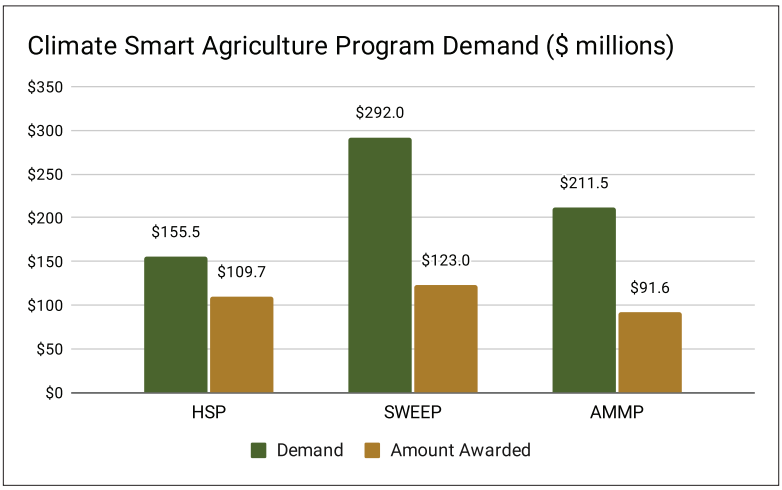
[18] As of August 23, 2023, the funding for 2023 had been committed but not yet awarded.

Farmer Interest and Participation

In spite of the barriers of unreliable funding and inconsistent technical assistance, farmers and ranchers have been ready and willing to participate in the programs. Although program funding has trended upwards since their inception, producer demand has kept pace and all three of the programs have been consistently oversubscribed (see Figure 3).

Farmer interest is an indicator that much more deployment of climate smart practices is possible. This bodes well for moving rapidly toward a climate-resilient future, provided that more resources are dedicated to unleashing the potential on our farms and ranches.

Figure 3. Climate Smart Agriculture Program Demand vs. Amount Awarded (2014–2022)[19]



CSA Program Evolution

The designs of the CSA programs have evolved and improved over time as CalCAN and other stakeholders have provided feedback to CDFA on how to lower barriers to participation and increase their impact. What follows is a short overview of some recent developments in program design.

Healthy Soils Program (HSP)

HSP pays farmers and ranchers a per-acre payment over three years to implement eligible healthy soils practices such as composting, cover crops, and hedgerows. Applicants can propose to implement one practice or multiple practices. About 67 percent of grantees receive funding to implement only one practice, in many cases for compost application, which limits the program impact since there is solid scientific evidence that greater climate benefits are gained by combining multiple soil health practices. CDFA is considering strategies for encouraging applicants to apply for support for stacked practices.

In addition to the incentives grants, HSP has awarded $11.1 million across 28 counties for a total of 78 three-year demonstration projects involving 25 different healthy soils practices. These projects have evaluated

[19] Calculated for each program cumulatively based on every year that program was funded.

the GHG emissions reductions associated with adoption of healthy soils practices. They also involve farmer outreach and education via farm tours showcasing the project techniques and outcomes, creating opportunities for farmer-to-farmer knowledge exchange, which is well known to be an effective method for driving changes in practices.

In 2023, CDFA experimented with a block grant approach in an effort to accelerate the disbursement of the unprecedented volume of funds CDFA received in the past two budget cycles, better coordinate technical assistance, and better address local and regional needs (see more in the Funding for Land Conservation section below). They also allowed block grantees to purchase equipment needed to carry out healthy soils practices and lend it to producers.

State Water Efficiency and Enhancement Program (SWEEP)

SWEEP offers grants to implement irrigation upgrades that both reduce greenhouse gas emissions and conserve water. Typical projects include conversion to drip irrigation, soil moisture monitoring equipment, pump improvements, and solar pumps. In response to concerns that the program left out farmers who use mainly gravity-fed flood irrigation systems with low energy demands—particularly those in the Coachella and Imperial Valley region—CDFA recently set up a pilot program that better serves operations in the desert.[20] In other parts of the state, building in flexibility for farmers to alternate between irrigating with surface water or groundwater sources will be increasingly important as large fluctuations between flooding and drought become the new normal.

Alternative Manure Management Program (AMMP)

AMMP provides assistance to dairy and livestock farmers to transition to dry manure management practices that reduce methane emissions. CDFA assumes that methane emissions reductions from AMMP projects persist for five years while for anaerobic digesters they assume 10 years, though there is no research supporting this distinction, and this creates an advantage for digesters. AMMP is especially attractive to small and medium-sized dairy producers and has been consistently oversubscribed. The program receives only about one-third the funding of a related program that subsidizes the installation of anaerobic digesters on large dairies that capture methane and convert it to bio-energy.[21]

The program requires applicants to invest a substantial amount of time and money preparing their project proposals. This serves as a deterrent, particularly given the irregular funding levels available year-to-year that interrupt momentum and the fact that competition is steep for the limited funding available, making producers reluctant to do the substantial up-front work to apply.

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[20] In 2022, the Southern Desert Pilot program made 17 awards totaling $2.7 million in grants across 3,300 acres and leading to an estimated 4,800 acre-feet of water savings per year. From a presentation, 2022 SWEEP Southern Desert Region Funding Selection, to the CDFA Science Advisory Panel in February 2023.

[21] The Dairy Digester Research and Development Program, created in 2015, was initially the state's sole strategy for reducing methane emissions associated with dairy production. The program funds anaerobic digesters installed on dairy manure lagoons to capture methane and convert it to biogas. This program has received a total of $213,730,000 in funds to date and funded 131 projects.

FUNDING FOR LAND CONSERVATION

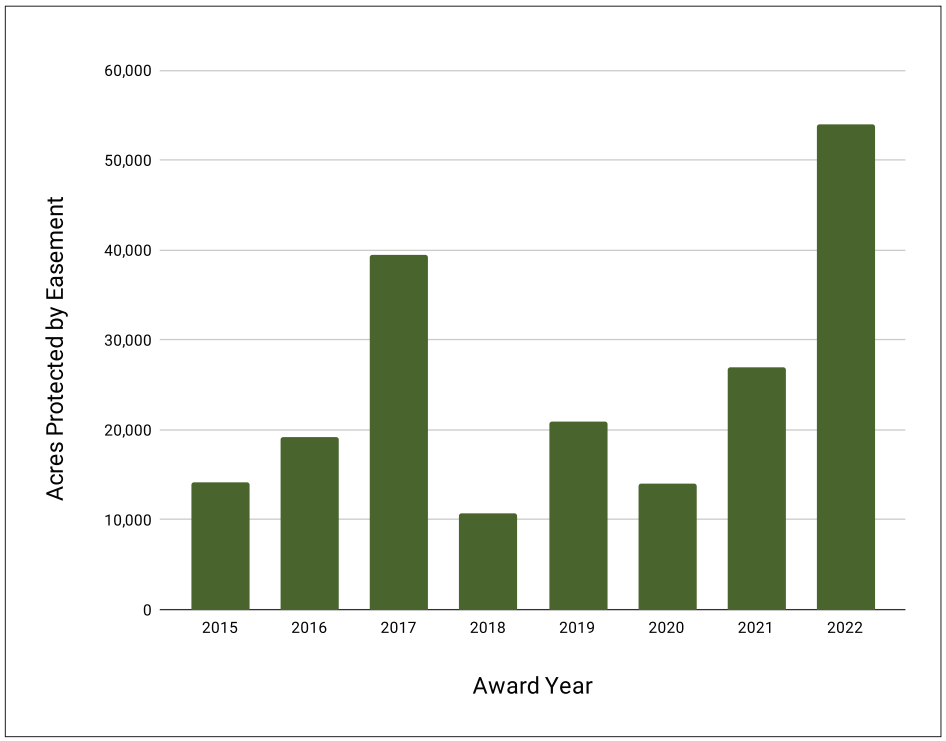
Every year, California loses 50,000 acres of agricultural land, almost 80 percent of which is lost to urban development.[22] Preserving agricultural land while preventing sprawl and encouraging infill development is critical to ensuring continued agricultural production and realizing the climate potential of agricultural land.

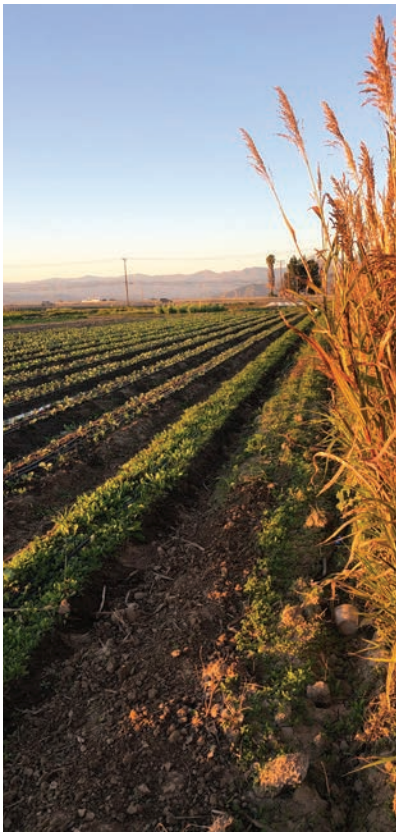
Sustainable Agricultural Lands Conservation

The Sustainable Agricultural Lands Conservation (SALC) Program, administered by the Department of Conservation (DOC), seeks to prevent increases in GHG emissions that come with urban and suburban sprawl by protecting farm and ranch land that is at risk of development. Since it was launched in 2015, SALC has received a continuous appropriation of two percent of the state's cap-and-trade Greenhouse Gas Reduction Fund. It has provided over $373 million in funds to 216 grantees. Of these, 166 grants have funded conservation easements, 20 awards have been for capacity building, and 30 have been for planning grants.[23]

To date, 199,000 acres of agricultural land have been placed under a conservation easement as a result of the program. By way of comparison, the California Farmland Conservancy Program, which began funding agricultural conservation easements more than 25 years ago primarily through bond measure funding, has protected 59,460 acres with a total of $88.6 million in grants.[24]

Figure 4. Acres Protected by SALC-Funded Easements (2015–2022)





[22] American Farmland Trust. Protecting California Farmland and Ranchland.
[23] Data available from DOC Funded SALC Projects
[24] American Farmland Trust. 2022. Status of State PACE Programs

FUNDING FOR TECHNICAL ASSISTANCE

Technical assistance (TA) is critical to pair with incentives and research to help farmers transition to climate-resilient agriculture, as changing management practices requires learning and support. Effective TA includes activities such as outreach, education, identifying the most scientifically valid, economical and feasible practices, and supporting producers with grant applications, contract compliance and reporting. To serve farmers of color and those with limited English proficiency, racially diverse TA providers who possess cultural and language literacy are critical. After several decades of disinvestment beginning in the 1990s, the state has begun re-investing in some technical assistance resources specifically targeted to accessing and utilizing the CSA programs.

CDFA Climate Smart Agriculture Technical Assistance Fund

In 2018, AB 2377 (Irwin) created a five percent set-aside fund within HSP, SWEEP, and AMMP to fund technical assistance to help with project development, application, implementation, and reporting. The set-aside prioritizes technical assistance for small and mid-sized farms and requires that 25 percent of funds are used for historically underserved farmers and ranchers.[25] This program has made 52 awards to technical advisors totaling $4.8 million to help farmers and ranchers access the CSA programs.[26] In the most recent HSP solicitation in 2021, 31 percent of applicants received assistance from a technical assistance provider funded through this program, and 73 percent of those applicants were successful as compared to 65 percent of those with no assistance.[27] This program has been an important resource for building TA capacity particularly in Resource Conservation Districts (RCDs) and in the non-profit sector.

Photo Credit: USDA

In 2023, CDFA launched block grant pilot projects for the HSP and SWEEP programs to test whether block grantees can better address local and regional needs, improve the coordination of technical assistance, and speed up the distribution of funds to producers. Qualified organizations such as RCDs, irrigation districts, Groundwater Sustainability Agencies, and agricultural non-profit organizations apply for state funding and, if awarded, then disburse funds to eligible farmers, ranchers, or agricultural operations for on-farm projects. Demand for the block grants was high in the first round of solicitations. For HSP, the demand was more than 3.5 times higher than the $29 million available, and for the $40 million available for SWEEP block grants, the demand was four times higher.

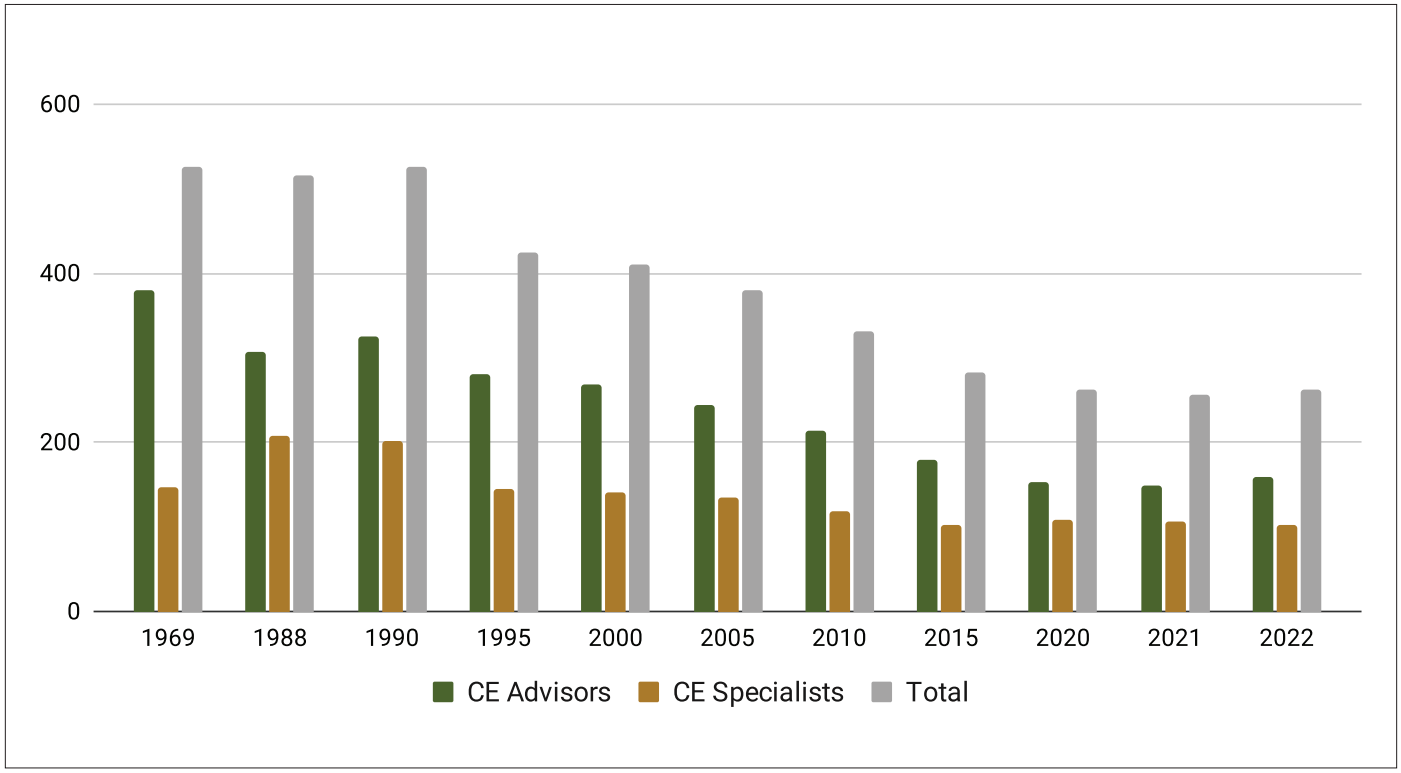
[25] Socially disadvantaged farmers and ranchers.
[26] CDFA program data 2019; EFA SAP presentation at the Environmental Farming Act Science Advisory Panel, Jan 2022, p. 46.
[27] Health Soil Program Environmental Farming Act Science Advisory Panel Meeting, September 9, 2022

University of California Cooperative Extension Service

Now under the oversight of the University of California Division of Agriculture and Natural Resources (UCANR), the UC Cooperative Extension Service (UCCE) was established in 1897 with a mission to share university research with California's growers and provide practical guidance about how to apply the science to their operations. In the past two decades, state funding for UCCE decreased by 50 percent.[28] Until the early 1990s, Cooperative Extension had over 500 advisors and specialists, but that number has declined steadily to a low of 257 in 2021.

California ranks 38th in the United States for public funding for Cooperative Extension relative to agricultural sales.[29] This disinvestment has resulted in a hollowing out of Cooperative Extension and left critical needs unmet. UCANR staff and stakeholders identified 120 positions that are critical needs, 69 of which are directly related to agriculture. Building back this capacity is a vital part of what will be needed to bridge the gap between research and practice in an unstable climate future.

Figure 5. Cooperative Extension Advisors and Specialists (1969–2022)[31]



[28] UC Agriculture and Natural Resources, Budget and Staffing Analysis to Meet the Needs of all Californians

[29] Ibid.

[30] Ibid.

[31] Data from UC Cooperative Extension, email communication. Numbers of staff are expressed in full-time equivalents. Extension farm advisors work with producers in their counties to conduct research, host on-farm demonstrations, and provide technical expertise on a host of issues. Academic Extension. specialists are issue experts and work with the Cooperative Extension farm advisors and university researchers to be a bridge connecting the needs of the agricultural community with the expertise of the university.

Climate Smart Agriculture Community Education Specialists

Soon after the launch of the CSA programs, UCANR and CDFA embarked on a partnership to hire what is currently a team of 10 Climate Smart Agriculture Community Education Specialists to provide outreach, education, and technical assistance for farmers interested in the CSA programs.[32] In the most recent HSP solicitation in 2021, 12 percent of applicants received assistance from CSA Community Education Specialists, and 94 percent of their applications were successfully awarded, as compared to 65 percent of those with no such assistance.[33]

Resource Conservation Districts

RCDs are a type of special district formed in the 1940s. They work on a variety of conservation issues, such as soil health, wildfire mitigation, regional watershed planning and energy efficiency. Similar to Cooperative Extension, RCDs have experienced staffing reductions due to state and local government budget cuts over the past few decades, with a big decline during the 2008 state fiscal crisis. There are currently 77 RCDs with 144 staff focused on technical assistance and several gaps in coverage, particularly in the San Joaquin Valley.

Despite these budgetary challenges, RCDs have worked to build their capacity through partnerships and other funding sources. For example, seven RCDs partnered with NRCS, UCANR, Santa Rosa Junior College staff, the Carbon Cycle Institute, producers, and producer associations to create the North Coast Soil Hub. This hub works to address region-specific needs and advance climate-resilient agriculture in the North Coast region.[34] Other RCDs have also worked to support climate-resilient agriculture through various efforts. One other such effort is through the development of carbon farm plans, which help farms evaluate and quantify their carbon sequestration potential and environmental co-benefits. The RCD Project Tracker, which tracks a variety of RCD-supported projects using voluntary reporting by producers, has recorded 94 carbon farm projects.[35]

[32] UC ANR's Climate Smart Agriculture Program; UC ANR's Climate Smart Agriculture Program Technical Assistance Providers
[33] Health Soil Program Environmental Farming Act Science Advisory Panel Meeting, September 9, 2022
[34] North Coast Soil Hub
[35] RCD Project Tracker

FEDERAL CLIMATE AND AGRICULTURE CONSERVATION PROGRAMS

A decade ago, the federal government provided no agricultural climate resources, but this is changing under the Biden Administration. Funded through the farm bill, the USDA NRCS agricultural conservation programs are the largest and most long-standing investment in natural resource conservation in the country. Originally named the Soil Conservation Service, it was started in 1935 to recover from and prevent the deepening impact of the Dust Bowl crisis. In recent years, NRCS has returned to its roots, reinvigorating and elevating its focus on soil health as a strategy for curbing climate change and improving resilience. Most of the practices eligible for funding under HSP are practices in NRCS's Environmental Quality Incentives Program (EQIP) and Conservation Stewardship Program (CSP).

In 2014, USDA published a massive literature review to "create a standard set of GHG estimation methods for use by USDA, landowners, and other stakeholders to assist them in evaluating the GHG impacts of their management decisions."[36] They also invested considerable resources to calibrate and create a farmer-friendly user interface for Comet-Planner, a web-based tool for estimating carbon sequestration and net GHG emissions from soils and biomass for U.S. farms and ranches. The HSP requires applicants to use Comet-Planner to evaluate the GHG emissions associated with their proposed projects. Also in 2014, USDA Secretary Tom Vilsack announced the creation of what are now nine Regional Hubs for Risk Adaptation and Mitigation to Climate Change around the country, including one in California.[37]

In the past two years, during Secretary Vilsack's second term at USDA, two significant developments have dramatically changed the climate funding landscape.

First, in 2022 USDA launched a program called Partnerships for Climate Smart Commodities.[38] The projects are intended to expand markets for climate smart crops, provide technical and financial assistance to producers to implement climate smart practices, and catalyze new cost-effective methods for quantification, monitoring, reporting, and verification of GHG benefits. USDA awarded $3.1 billion to 141 projects (including 31 projects in California) estimated to reach over 60,000 farms and 25 million acres of working land. USDA is also facilitating a learning network between grant recipients to share information about project practices and approaches.


Photo Credit: USDA-NRCS

Second, the Inflation Reduction Act (IRA) of 2022 makes an historic $20 billion investment by increasing

[36] Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry. USDA Technical Bulletin 1939.
[37] USDA Climate Hubs
[38] USDA Partnerships for Climate-Smart Commodities

funding in four existing farm bill conservation programs for practices that increase soil carbon or reduce carbon dioxide, methane, or nitrous oxide emissions.[39] Most of the money will be appropriated across the country over fiscal years 2023–2026 as follows:

Environmental Quality Incentives Program (**EQIP**)	**$8.45 billion**	
Conservation Stewardship Program (**CSP**)	**$3.25 billion**	(including some funding for organic transition)
Regional Conservation Partnership Program (**RCPP**)	**$4.95 billion**	(includes forestlands)
Agricultural Conservation Easement Program (**ACEP**)	**$1.4 billion**	(for farmland easements)


Photo Credit: USDA

For many years, NRCS has struggled with insufficient staffing to keep pace with the available funding in the farm bill conservation programs. Though funding levels have been approximately consistent, NRCS capacity declined 16 percent from 405 California staff in 2010[40] to about 340 currently.[41] Beginning in 2023, the influx of IRA funding (which steps up considerably each year through 2026) will place an even greater strain on NRCS personnel. One danger is that the funds may not be equitably distributed since NRCS lacks the capacity and culturally and linguistically literate staff needed to reach and serve socially-disadvantaged farmers and ranchers.

The IRA also allocated $1 billion during fiscal years 2022–2031 to support NRCS staff in providing technical assistance on project design and implementation. And it budgets $300 million for the Greenhouse Gas Inventory and Assessment Program housed at the Office of the Chief Economist to collect field data to assess carbon sequestration and greenhouse gas emissions reductions associated with climate-resilient agricultural practices over time.

[39] Blog by NSAC. August 19, 2022. Inflation Reduction Act of 2022: A Deep Dive on an Historic Investment in Climate and Conservation Agriculture

[40] NRCS state technical advisory committee meeting. August 26, 2010

[41] NRCS state technical advisory committee meeting. April 5, 2023

CONCLUSION

As this *State of the State* report summarizes, California policymakers have begun the critical work of providing resources and funding for the research, technical assistance, and incentives needed to catalyze a transformation of our farming system to greater climate resilience.

However, the pace of the transition to a climate-resilient agriculture system is not keeping up with the pace of climate change and its devastating impacts. We are not on track to reach California's economy-wide climate goals, which are already insufficient for averting the catastrophic climate change that threatens people, ecosystems, and our food supply.

The current decade is a critical one for slowing the juggernaut of climate change. With more robust investments and resources, the state's farmers and ranchers can contribute much more to curbing climate change, while also safeguarding our food supply and improving the health and well-being of farmworkers, rural communities, and all Californians. Part two of CalCAN's *Climate Platform for California Agriculture* is titled *Tools for Transformation*. It addresses 11 solution areas to accelerate the transition in California agriculture toward net carbon neutrality and greater climate resilience between now and 2030. The sooner we make investments in nature-based farming and ranching climate solutions, the more powerful their impact will be.

Please join us in this important work of a generation.

Photo Credit: USDA-NRCS

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